

NON-LETHAL DEFENSE CONFERENCE/CALL FOR PAPERS EXPANDED USE FOR THE 66MM GRENADE FAMILY

by

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In today's environment with decreasing resources and military personnel the U.S. Armed Forces are called upon to meet many world wide challenges. Besides total armed conflict the services are required to perform peace-keeping missions in Somalia, Haiti, and Bosnia, policing at Guantanamo Bay, Cuba and drug interdiction along the U.S.-Mexican border. Many times U.S. forces are subjected to encounters with small armed factions or unruly crowds where containment is the objective, not warfare. Quick developing, threatening scenarios that deal with large groups of civilians make the use of force necessary to preserve order. Differences in culture, language and political alliances can complicate identifying threat from friendly civilians and the decision when or where to use force in a situation. In many instances U.S. forces have only lethal means in which to contain many of these encounters, where non-lethal "containment" use of force or crowd dispersion techniques would apply.

The U.S. Army's Project Manager (PM) Smoke and teams within the U.S. Army Edgewood Research Development & Engineering Center are developing the use of alternative non-lethal payloads for the 66mm grenade. They include stingball, distraction, and Ortho-chlorobenzalmalono-nitrile (CS).

Currently PM Smoke and the Target Defeat Team are designing a 66mm CS grenade by modifying a British L11 CS round. The objective is to product improve the grenade and provide the U.S. Army Military Police an additional capability to be used with their Light Vehicle Obscuration Smoke System. The munition will disperse 23 submunitions and have a range of 60-90 meters. The design team is also investigating an extended range of 150-300m for this grenade. CS affects primarily profuse tearing of the eye. It is conceived to be used in crowd and riot control and for convoy protection.

Another less-than-lethal munition being developed is the 66mm stingball grenade and stingball-flash bang combination grenade. The Defense Technology Corporation under contract with the government is investigating a 66mm rubber bodied grenade. Three types of grenade fills are being developed. One fill consists of .32 caliber rubber balls and another fill consists of .60 caliber rubber balls. A third fill, a rubber ball-flash bang combination is also being developed. Its range is predicted at 60-90 meters at a burst height of 7-12 meters with a aerial burst of 30-40 meters in diameter. Its primary purpose is not to incapacitate but to deter unwanted actions or prevent access to certain areas. A combined stinging sensation upon impact coupled with a sound or flash diversionary effect would induce both physiological and psychological effects.

PM Smoke in response to a need for light vehicle smoke protection created the Light Vehicle Obscuration Smoke System (LVOSS). The LVOSS consists of a launcher system, made up of 66mm four tube dischargers, visual 66mm smoke grenades, an arming/firing unit, wiring harnesses, and elevation and mounting brackets fixed to the turret or roof of High Mobility Multipurpose Wheeled Vehicle (HMMWV) variants. The M7 discharger made from an injection molded plastic (Xenoy) launches the M90, a

terephthalic acid filled grenade. This fill has low toxicity and is environmentally safe. This fill is designed to obscure in the visual and near infrared region. Each grenade is filled with 3 individual canisters which burn for 14 seconds. The grenade range is approximately 35 meters. Cloud duration is approximately 20 seconds. The grenades are launched in salvos of four providing an initial 60 degree spread of low toxicity smoke and minimum personnel hazard.

In addition to the CS grenade and stingball grenades being developed for use with the LVOSS for the military police, this wheeled vehicle launch system is ideal for launching other less-than-lethal grenades. With the high degree of use of the Up-Armor HMMWVs in policing and security missions, the LVOSS in combination with smoke and less-than-lethal grenades will make situation control more effective.

In addition to wheeled light vehicles, U.S. forces travel within the country policing areas and crowds using infantry vehicles and at times heavy armor. Equipped on many of these vehicles are Rapid Obscuration Systems (ROS) that consist of the standard 66mm grenade launcher system and the high explosive (HE) rapid obscuration grenades they deploy.

These Rapid Obscuration Systems currently installed on U.S. Armored Vehicles are an initial response to the advent of the first smart weapons which significantly decreased vehicle survivability during the advent of the Arab-Israeli Conflicts of the 60s and 70s. First generation ROS installed on U.S. Armored Vehicles were adaptations of the British discharger and their visual screening grenade, the L8. As seeker and guidance technology continued to improve from optically tracked, wire command link guided missile systems to weapons which could acquire targets in the mid and far infrared regions of the electromagnetic spectrum the smoke and obscurant community developed screening materials to extend protection of visual-only screening grenades through the infrared and eventually into the millimeter region.

The type-classified standard family of 66mm rapid obscuration grenades currently consists of the L8A3, a visual red phosphorous screening grenade, the M76, a visual and infrared screening grenade, the M81, a infrared and millimeter (radar) screening grenade, and the M82, a visual screening training grenade. These rapid obscuration grenades typically carry approximately 1.5-2 lb payloads and are deployed from the vehicle's launcher system to a distance of approximately 30 meters forward of the vehicle. They burst typically at a height equal to their launch height. The cloud duration for a single visual screening phosphorous grenade is approximately 3-5 minutes, whereas the duration for a single, infrared or bispectral screening grenade can be anywhere from 20-40 seconds.

The launcher system on each vehicle is comprised of a right and left grenade discharger. The type-classified standard family of launchers consists of the M250/M239, the M257/M243/M259, and the M6. The M250 smoke grenade launcher is comprised of two mirror image six-tube cast aluminum dischargers and two mirror image covers. Its twin, the M239 is comprised of the M250 launcher plus two identical externally mounted grenade stowage boxes and electronic firing switch. These launcher systems can fire any 66mm grenade. The system is capable of firing either one salvo of twelve grenades or two salvos of six grenades each. The dischargers are typically mounted at an elevation of 25 degrees from the horizontal. The discharger tubes are evenly spaced at 10 degrees

apart forming a 50 degree arc for each discharger. When installed, they provide coverage along a 110 degree arc.

The M257 smoke grenade launcher is comprised of two identical four-tube cast aluminum dischargers and eight rubber caps. Its twins, the M259 and the M243 are comprised of the M257 launcher plus additional equipment such as an arming/ firing unit for the M259 and smoke grenade stowage boxes for the M243. These launcher systems can fire any 66mm grenade. The system is capable of firing a single salvo of eight grenades. The dischargers are typically mounted at an angle of 25 degrees above the horizontal. The discharger tubes are evenly spaced at 15 degrees apart forming a 45 degree arc for each discharger and when installed they provide coverage along an arc of 105 degrees.

The M6 smoke grenade launcher is a four-tube rectangular block constructed of E-Glass/Epoxy composite and is painted with resonant Radar Attenuating Material (RAM). The composite material is strong, light and will not corrode. Its shape and coating help to minimize its radar cross section. Its designed use is intended to replace currently fielded six and four tube dischargers on selected current vehicles but is primarily designed to accommodate the needs of future Armored Systems Vehicles now in development. The M6 is easily adapted to a detector system and threat resolution module that comprises a vehicle integrated defense system giving it the capability to inventory and fire individual launch tubes. This provides the maximum flexibility in counter threat performance whereas the other launcher systems can only fire either all or a certain salvo of grenades. The M6 discharger has two banks of two launch tubes spaced 14.5 degrees apart. The M6 has the capability to be used as part of a Multi-Salvo Grenade Launcher (MSGSL) system. A MSGSL system on an armored vehicle is comprised of two to twenty four M6 launchers and can provide varying screening coverage capability. The maximum screening from a fully outfitted MSGSL system is a 360 degrees forward-of-the-vehicle coverage and a 360 degree overhead screening coverage.

Whether the vehicle, is an M1 Abrams tank, carrying the M250 launcher, an M2 Bradley Infantry Fighting Vehicle carrying the M257 launcher, or the new Heavy Assault Bridge outfitted with the M6 launcher, all smoke grenade launchers will accept a 66mm size grenade. This standard discharger size can be utilized for use with other types of grenades to support the U.S. Army's role in operations other than war (OOTW). This is especially important where U.S. forces are deployed where threatening situations develop and the use of non-lethal means would be adequate. To date the U.S. Army lacks the use of any other type of 66mm grenade, other than smoke, to be potentially useful in a non-lethal situation. Grenade loads should be modified to reflect changes in threat. Several foreign countries already have a wide variety of vehicular grenades that perform in multiple mission roles. The French for example have developed the GALIX, a modular self-defense system, for use on various ground combat vehicles. Its launch tubes can accommodate an extended range of ammunition and are loaded with ammunition appropriate to the requirement of a particular mission. The 80mm grenades are fired on a flat trajectory to give an almost immediate response with the ammunition and submunition design, giving an excellent effect pattern on the ground. The GALIX system can fire a wide variety of grenades to defend the vehicle against different threats. These include smoke, anti-personnel, illuminating, decoy and training rounds as well as high

intensity sound and tear gas less-than-lethal munitions. The GALIX system is designed to allow reconfiguration of its system to meet future threats. It is capable of being integrated into current or future detection suites allowing additional flexibility in its design.

With launch platforms and proven grenade technology already in use on U.S. vehicles and many chemical and mechanical payloads already developed the role to expand the use of the 66mm grenades could easily be accommodated. Depending on the requirement and the range, the 66 mm HE grenade could be modified to disperse a variety of non-lethal payloads, such as kinetic energy, binding, and acoustic devices. Kinetic energy devices could disperse soft/hard projectiles and slippery fluids. Binding devices could send out adhesives or entanglements. Acoustic devices could be used that carry flash/bang, acoustic jamming and infrasound payloads. Illuminating devices could dispense flares. Riot control devices could dispense irritants, odor producing chemicals, calming agents, or gastrointestinal convulsives. Many other potential uses exist.

These non-lethal 66mm grenades could be used to disperse or subdue crowds, keep personnel from surrounding or climbing on patrol vehicles, slow or halt threatening personnel and vehicles, and even incapacitate individuals for capture.

Engineers, military police, infantry and armor personnel would highly benefit from the increased non-lethal capability of their vehicle's ROS in threatening environments in Operations Other Than War (OOTW). Grenades and launcher hardware is currently available to significantly improve vehicle and crew force protection.